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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,046	10/28/2003	Takayuki Ito	04329.3167	7595

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EXAMINER
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TOBERGTE, NICHOLAS J

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/694,046	ITO, TAKAYUKI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Nicholas J. Tobergte	2823	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 16-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-15 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/20/06 10/28/03</u>  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Claims 1-15 in the reply filed on 10/4/06 is acknowledged.

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The disclosure is objected to because of the following informalities: See 112 rejection below. Clarification of which elemental group being used during the ion implantation is necessary in order to further prosecution.

Appropriate correction is required.

### ***Claim Objections***

Claim 7 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 7 depends upon claim 5. Claim 5 recites that a flash lamp annealing does the pre-heating. Claim 7 broadens the scope of claim 5 by reciting that the pre-heating can be done by a hot-plate, heating lamp or laser beams.

Claim 8 recites the limitation "as the heating lamp" in Claim 5. There is insufficient antecedent basis for this limitation in the claim.

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Claim 4, 6, 11, and 13 are objected to because of the following informalities: The Applicant might have used an outdated table of elements when writing the disclosure and claims. Conventional knowledge at this time has group IV-B elements consisting of Ti, Zr, Hf and Rf. The elements C, Si, Ge, Sn or Pb belong to the group IV-A. Furthermore, another modern interpretation of the table of elements could have group IV-B elements labeled simply as group 4 and group IV-A elements labeled as group 14. Please note however, that should the Applicant amend claim 4 to show the appropriately updated table of element grouping (i.e. IV-A) then claim 6 will be objected to for failing to further limit the parent claim as reciting all the elements in the group is the same as claiming the group of elements. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Pertaining to claim 9, Applicant discloses, "entirely implanting electrically inactive first impurity to one main surface of the semiconductor substrate". The Applicant repeats this assertion in the same claim in a subsequent paragraph. Even though there is now

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provided a gate sidewall film around the gate electrode, the use of the term "entirely" renders the claim indefinite. How can the main surface of the semiconductor substrate be "entirely" implanted with the first impurity twice over?

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gofuku (US 6,190,911).

Pertaining to claim 1, Gofuku teaches a method of manufacturing a semiconductor device, comprising:

entirely implanting electrically inactive first impurity to one main surface of a semiconductor substrate; and

carrying out heat treatment with respect to the semiconductor substrate to which the first impurity is implanted. **See Claim 1**

Gofuku fails to specifically detail that the heat treatment is carried out by light.

However, it would have been notoriously obvious to one of ordinary skill in the art at the time the invention was made to choose light (i.e. a lamp) as a heat treatment means.

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The use of light as a means for heating is not inventive since it is well known to one of ordinary skill in the art that light generates some amount of thermal energy and it would have been obvious to select a well known method of heating. See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) (selection of a known plastic to make a container of a type made of plastics prior to the invention was held to be obvious)

Pertaining to claim 2, Gofuku teaches the method according to claim 1, further comprising:

implanting electrically active second impurity having predetermined conduction type to the semiconductor substrate before the heat treatment is carried out; and

carrying out the heat treatment with respect to the semiconductor substrate to which the first and second impurities are implanted, and thereby activating the second impurity. **See Claim 1.**

Pertaining to claim 3, Gofuku teaches the method according to claim 1, wherein the first impurity is ion-implanted to the surface layer of the semiconductor substrate at concentration of  $1 \times 10^{19} \text{ cm}^{-3}$  or more. **See Claim 1.**

Pertaining to claims 4 and 6, Gofuku teaches the method according to claim 1, wherein at least one of the group IV-B (Examiner is assuming IV-A elements) is used as the first impurity. **See Claim 1, Ge and Sn are IV-A elements**

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Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gofuku as applied to claims 1-3 above, and further in view of Arai et al (US 4,504,323).

Pertaining to claim 5, Gofuku teaches the method according to claim 1, but fails to teach a pre-heating step to less than 600 degrees C before carrying out the heat treatment, wherein the pre-heating being flash lamp annealing carried out under conditions that light emitting time is 100msec or less and irradiation energy density is 100 J/cm<sup>2</sup> or less.

Arai teaches a pre-heating step to less than 600 degrees C. Arai also teaches that heating can be done using a xenon lamp or any flash discharge lamps. Arai fails to teach that the pre-heating step is done using said xenon or flash lamps, but teaches using a conventional furnace for the preheating. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to use the lamps as a means for pre-heating the wafer before performing the final anneal using the lamps. See also Timans et al (US 6,951,996) which discusses various pre-heating and heating steps for semiconductor annealing. Choosing and or reordering well known procedures or methods to one of ordinary skill in the art is not inventive. See also Ex parte Rubin , 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also In re Burhans, 154 F.2d 690, 69 USPQ

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330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); In re Gibson, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious.).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas J. Tobergte whose telephone number is 571-272-6006. The examiner can normally be reached on Mon - Thur 7am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.




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NJT



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Primary Examiner  
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